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DRAWINGS ATTACHED

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(54) A CYCLE FRAME

(71) We, RALEIGH INDUSTRIES LIMITED, a British Company of 177 Lenton Boulevard, Nottingham, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention concerns cycle frames.

An object of the present invention is to produce a cycle frame which is capable of being formed from a small number of individual parts and is thus easily assembled.

The present invention provides a cycle frame comprising a rigid frame formed from a pair of moulded matched side shells of plastics material joined together in opposed relation in which said side shells, when joined, provide openings for components to be fitted to the rigid frame and provide at least a main frame member, a head tube and a seat tube.

The invention will be described further, by way of example only, with reference to the accompanying drawings in which:—

Fig. 1 is a side elevation of a cycle frame made in accordance with one form of the invention;

Fig. 2 is a plan view of the cycle frame of Fig. 1; and

Figs. 3 to 11 are sectional views of the frame of Figs. 1 and 2 taken respectively on the lines III—III to XI—XI of Fig. 1.

To produce a cycle frame in accordance with the invention two moulded matched side shells 10 and 11 of plastics material are provided. The two shells are produced conveniently from fibreglass reinforced polyester resin but of course any other synthetic plastics material which possesses suitable physical properties and rigidity when moulded or formed may be used. One shell is substantially a mirror image of the other.

Each shell provides halves of a head tube 12, a main frame member 13, a seat tube 14, a backstay 15 and a rear fork 16. The two shells 10 and 11 are secured together along abutting matching edges 17 (see Fig. 2) by an adhesive and the joint between the

two shells 10, 11 may be formed as a plain butt joint 18, as shown in the various sectional views herewith, or as a tongue and groove or lap joint. Alternatively of course the shells 10, 11 may be joined together by bolts, rivets or the like which pass through the components at suitable positions and spacings. It is also possible (as a further alternative) to joint the two shells together by fusing them along joint lines. This could be achieved, for example, by the application of heat or by ultrasonic welding.

The main frame member 13 may be stiffened by the formation of internal ribs 19, the ribs in shell 10 being matched with ribs in the shell 11 so that they will join. The adhesive used for joining the edges 17 is also used in the ribs 19.

To aid rigidity of the rear fork 16 there is provided a curved external strengthening rib 20 on each shell and this rib 20 extends from a position just forwardly of the seat tube 14 to a position adjacent the extremity of the rear fork 16. On one shell the curved rib may be shaped to serve as a chain guard.

The main frame member 13 is preferably double walled (as shown in Fig. 3 and indicated by the references 13a and 13b) on its edge adapted to be lowermost in the complete frame so that cables (not shown) such as brake cables, gear change cables, and lighting set cables can be contained within the hollow space 13c formed between the two walls. For ease of insertion and removal of the cables the ends of the space adjacent the head tube 12 and the seat tube 14 are open, the opening, indicated by the reference numeral 21, at the seat tube end of the main frame member 13 only being shown (Fig. 1).

At the end of the rear fork 16 are provided metal rear wheel spindle receiving elements 22 having spindle receiving slots 23.

There may be formed in the shells, at that end of the rear fork 16 which lies below the seat tube 14, a semi-circular recess 24 so positioned that when the shells 10, 11 are assembled a circular hole 24a is provided

and adapted to receive the mounting member of a prop stand (not shown).

The end regions 25 at least of each half of the head tube 12 are semi-circular in cross-section (at least internally) so that when the shells 10, 11 are assembled a front fork tube (not shown) can be located in the head tube and positioned correctly. In order to prevent wear on the head tube ends they may be provided with metallic or plastics material inserts or sleeves 25a into which the front fork tube is located. Below the halves of the seat tube 14 each shell is provided with a circular hole 26 into which can be located an annular sleeve 27 adapted to receive a pedal crank spindle and bearings (not shown).

To join the shells their edges which are to come into contact are coated with an adhesive and the two shells are brought together and clamped in position until the adhesive has set. The sleeves 25a if used are positioned after the frame parts have been secured together. The sleeves 27 and the rear wheel spindle receiving elements 22 are effectively integral with the main components, the sleeves 27 and elements 22 being attached to the main components during the moulding operation carried out to form them.

The space indicated by the reference number 28, between the seat tube, backstay 15 and rear fork 16 may be used as a receptacle for small objects such as tools and when this space is so used removable cover members in the form of plastic panels 28a are provided to close the space. The space 28 is closed by a wall moulded integrally with each shell 10 and 11 and a base for such space is provided, half being formed on one shell and half on the other.

The general wall thickness of the two shells is generally uniform but in positions of high stress, such as in the main frame member 13 and in the region around the prop stand aperture 24a, and around the pedal crank aperture 26 this thickness may be considerably increased.

The frame is of generally orthodox configuration having a smooth external surface devoid of sharp corners or protuberances so that it is easily cleaned and does not provide any parts likely to become entangled with a rider's clothing.

Since the material of the shells is capable of being coloured it is not necessary to paint or enamel the frame after assembly and of course surface scratches or abrasions are not easily discernable in a coloured plastics material. Additionally the frame is not susceptible to deterioration by rusting or corroding. It is also thought that there will be a reduction in weight of frames as compared to a standard tubular metal frame and of course the need for relatively large numbers of welding or brazing operations is elimin-

ated thus making assembly a relatively simple and rapid operation.

If desired the shells may be modified in form so that each one includes part of a luggage carrier and part of a mudguard. In such a construction the two shells are not necessarily mirror images one of the other. These parts would be formed in the requisite positions between the seat tube and rear fork. In a further alternative the luggage carrier and mudguard could be formed wholly on one of the shells, the other being formed to enable its seat tube part and rear fork to be correctly positioned when the two shells are secured together.

Whilst reference has been made to the use of inserts or sleeves at the pedal crank and in the head tube these may, it is thought, be omitted in some cases, for example when the frame is for a small cycle. The prop stand aperture may also be omitted if desired. In the case of small cycles the stiffening ribs in the main member may also be omitted if desired.

WHAT WE CLAIM IS:—

1. A cycle frame comprising a rigid frame formed from a pair of moulded matched side shells of plastics material joined together in opposed relation in which said side shells, when joined, provide openings for components to be fitted to the rigid frame and provide at least a main frame member, a head tube and a seat tube.

2. A frame according to claim 1 wherein the joined shells also provide a rear fork and a back stay.

3. A cycle frame according to claim 2 comprising strengthening ribs, one on each side of the frame and extending from forwardly of the seat tube to a position adjacent the extremity of the rear fork.

4. A cycle frame according to claim 3 in which one of said ribs is shaped to serve as a chain guard.

5. A cycle frame according to claim 1 wherein the shells have stiffening ribs formed internally, the ribs in one shell being matched with and joining with ribs in the other shell.

6. A cycle frame according to claim 1 having wear-preventing inserts in at least some of the openings for components to be fitted to the frame.

7. A cycle frame according to claim 1 in which the main frame member is double walled in the lowermost region to provide a space for cables.

8. A cycle frame as claimed in claim 2 in which a receptacle is defined by the joined shells between the seat tube, back stay and rear fork.

9. A cycle frame as claimed in claim 1 having a mudguard defined by the joined shells.

10. A cycle frame as claimed in claim 1

having a luggage carrier defined by the joined shells.

11. A cycle frame substantially as herein-
before described with reference to the accom-
panying drawings.

- 5 12. A cycle frame according to any preced-
ing claim in which the shells are made from
fibreglass reinforced polyester resin.

13. A bicycle having a frame made accord-
ing to any preceding claim.

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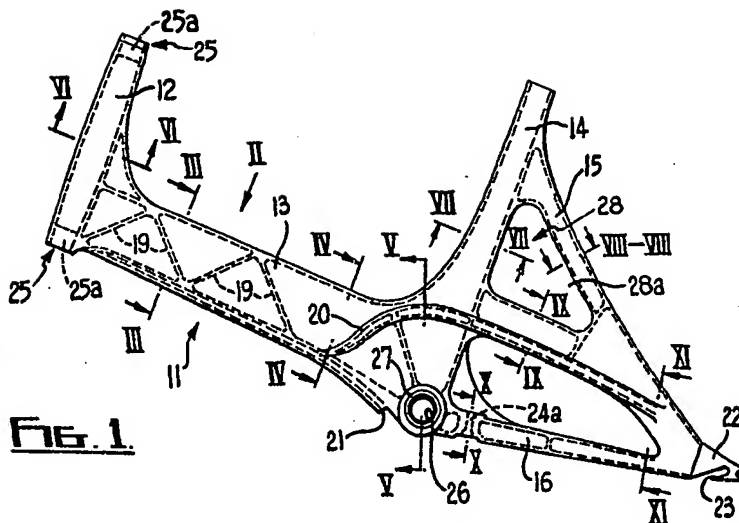


FIG. 1.

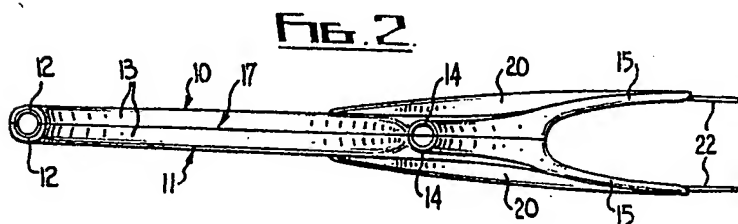


FIG. 2.

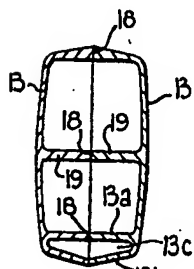


FIG. 3.

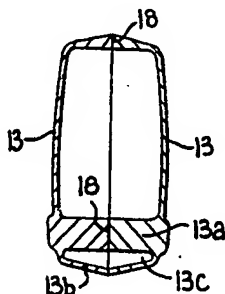


FIG. 4.

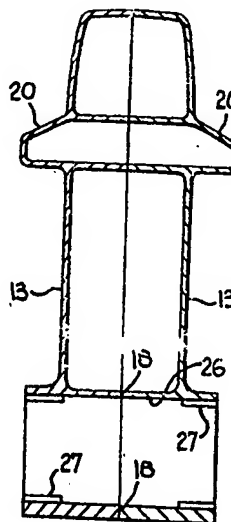


FIG. 5.

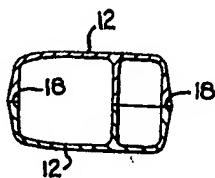


FIG. 6.

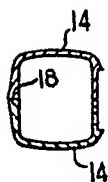


FIG. 7.

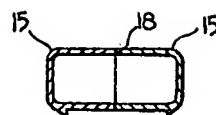


FIG. 8.

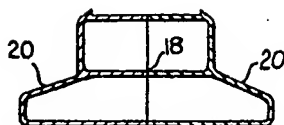


FIG. 9.

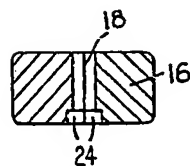


FIG. 10.

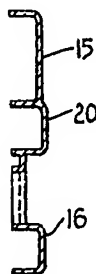


FIG. 11.